What is claimed is:

1. A fabric card for routing data packets comprising:

a plurality of ingress/egress ports;

a switching component through which the ports connect; and

a scheduling component for scheduling communication between the plurality of ports through the switching component;

characterized in that data coming into one of the plurality of ports is organized into specific data-packet trains each having a start-of-train (SOT) identifier and an end-of-train (EOT) identifier, and wherein the switching facility recognizes the SOT and the EOT identifiers and switches transmission to a next port and train accordingly.

2. The fabric card of claim 1 wherein the switching facility comprises a plurality of individual cross-point application-specific integrated circuits (CPAs).

3. The fabric card of claim 2 wherein individual ones of the CPAs further comprise a queue for listing assignments for transmission .

4. The fabric card of claim 2 wherein each CPAs is capable of switching to next port assignment of its own accord.

5. The fabric card of claim 2 further comprising data queues (D-FIFOs) following individual ones of the CPAs for buffering data flow to an egress port .

6. The fabric card of claim 1, wherein each port receiving data requests authorization to transmit from the scheduling component, and also sends an almost done flag (ADF) to the scheduling component prior to the EOT.

7. The fabric card of claim 6 wherein the scheduling component uses the ADF to trigger scheduling the sending port for a new transmission.

8. A method for high-speed transmission of packet data from ingress to egress ports connected across a fabric card through a switching component, comprising the steps of:

(a) organizing incoming data into a packet train and inserting therein additional data comprising a start of train (SOT) and an end of train (EOT) identifier;

(b) requesting permission from a scheduling component to transmit the assembled packet train from ingress to egress on the card through the switching component;

(c) upon receiving authorization to transmit by an ingress port, transmitting the assembled packet train through the switching component; and

(d) upon recognizing the EOT of a packet train, switching transmission to a different packet train.

9. The method of claim 8 wherein the switching facility comprises a plurality of individual cross-point application-specific integrated circuits (CPAs).

10. The method of claim 9 wherein individual ones of the CPAs further comprise a queue for listing assignments for transmission.

11. The method of claim 9 wherein each CPAs is capable of switching to next port assignment of its own accord.

12. The method of claim 9 further comprising data queues (D-FIFOs) following individual ones of the CPAs, the queues buffering data flow to an egress port.

13. The method of claim 8 wherein each port receiving data requests authorization to transmit from the scheduling component, and also sends an almost done flag (ADF) to the scheduling component prior to the EOT.

14. The method of claim 13 wherein the scheduling component uses the ADF to trigger scheduling the sending port for a new transmission.

15. A packet switching element comprising:

a plurality of ingress/egress ports; and

data switching components between ports;

characterized in that data coming into a first one of the plurality of ports is organized into specific data-packet trains each having a start-of-train (SOT) identifier and an end-of-train (EOT) identifier, and wherein the switching element recognizes the SOT and the EOT identifiers and switches transmission to a next port and train accordingly.

16. The packet switching element of claim 15 wherein the data switching components comprise a plurality of individual cross-point application-specific integrated circuits (CPAs).

17. The packet switching element of claim 16 wherein individual ones of the CPAs further comprise a queue for listing assignments for transmission.

18. The packet switching element of claim 16 wherein each CPAs is capable of switching to a next port assignment of its own accord.

19. The packet switching element of claim 16 further comprising data queues (D-FIFOs) following individual ones of the CPAs for buffering data flow to an egress port.

20. The packet switching element of claim 15 wherein each port receiving data requests authorization to transmit from a scheduling component, and also sends an almost done flag (ADF) to the scheduling component prior to the EOT.

21. The packet switching element of claim 20 wherein the scheduling component uses the ADF to trigger scheduling the sending port for a new transmission.

22. A data packet router, comprising:

external ingress/egress ports for receiving and sending data packets to and from neighboring routers or hosts; and

one or more packet switching elements, each having a plurality of local ingress/egress ports and data switching components between the local ports;

characterized in that data coming into a first one of the plurality of ports is organized into specific data-packet trains each having a start-of-train (SOT) identifier and an end-of-train (EOT) identifier, and wherein the

switching element recognizes the SOT and the EOT identifiers and switches transmission to a next port and train accordingly.

23. The data packet router of claim 22 wherein the data switching components comprise a plurality of individual cross-point application-specific integrated circuits (CPAs).

24. The data packet router of claim 23 wherein individual ones of the CPAs further comprise a queue for listing assignments for transmission.

25. The data packet router of claim 23 wherein each CPA is capable of switching to a next port assignment of its own accord.

26. The data packet router of claim 23 further comprising data queues (D-FIFOs) following individual ones of the CPAs for buffering data flow to an egress port.

27. The data packet router of claim 22 wherein each port receiving data requests authorization to transmit from a scheduling component, and also sends an almost done flag (ADF) to the scheduling component prior to the EOT.

28. The data packet router of claim 27 wherein the scheduling component uses the ADF to trigger scheduling the sending port for a new transmission.